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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/766,298	01/27/2004	Edward J. Sommer JR.	S1404.70004US01	9344
7590 05/16/2006				
Daniel P. McLoughlin Wolf, Greenfield & Sacks, P.C. 600 Atlantic Avenue Boston, MA 02210			EXAMINER MATTHEWS, TERRELL HOWARD	
			ART UNIT 3654	PAPER NUMBER

DATE MAILED: 05/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/766,298

Applicant(s)

SOMMER ET AL.

Examiner

Terrell H. Matthews

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on 13 March 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 13-61 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 13-61 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### **FINAL REJECTION**

Applicants arguments filed 3/13/2006 have been fully considered but they are not persuasive for reasons as detailed below.

The prior art rejections are maintained or modified as follows:

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claims 27-30 recites the limitation "the first belt" and "the second belt" in line 2 of the respective claims. There is insufficient antecedent basis for this limitation in the claim.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3,7-9,13-25,31-39, 41-47, 49-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grodzins (US-6801595) in view of Graft (US-6753957).

Referring to claims 1-3,7-9,13,19 Grodzins discloses, "X-Ray Fluorescence combined with Laser Induced Photon Spectroscopy". See Figs. 1-3 and respective

portions of the specification. Grodzins further discloses detecting x-rays fluoresced from material and detecting optical emissions emitted from plasma resulting from a vaporization of a portion of the material (See at least col. 4 l. 7-36). Grodzins further discloses identifying the material based on the detected x-rays and the detected optical emissions (See at least col. 4 l. 62 – Col. 5 l. 26). It is generally understood that using the first fluorescence technique first to identify the material and then subsequently using a second technique to help clarify the material is broadly construed as reducing the number or potential classifications by first analyzing on a first of two types of emissions and selecting one of the reduced number of classifications by analyzing only a second one of the two types of emissions that was not analyzed by the first technique. If applicant disagrees that applicant teaches classifying the number of potential classifications by analyzing a first of two types of emissions and selecting one of the reduced number of classifications by one of the two types that was not analyzed by the first technique. Graft discloses “Mineral detection and content evaluation method” as claimed. See at least Figs 1-18 and respective portions of the specification. Graft further discloses a system and method for identification of specific species in samples in which the detection of those ions is performed by a source of irradiation, such as a laser energy emitter, or other suitable source excitation source, and means for delivering to and focusing the irradiation on a sample on a moving belt as well as a detection system and processor. Graft further discloses analyzing only the detected optical emissions to reduce the predetermined number to a reduced number of potential classifications (See at least Col. 4 l. 65 – Col. 5 l. 6). It would have been obvious to a person of ordinary skill

in the art at the time of the invention to modify the apparatus of Grodzins to include the teachings of Graft so that one of the first techniques reduced the number of classifications and the second technique was used to select one of the reduced classifications so that the classification was more efficient and could cover a broader range of materials. Furthermore, it would have been obvious to a person of ordinary skill in the art at the time of the invention that the materials could be classified by using only the detected x-rays or the detected optical emissions. It should be noted that it is generally known in the field of the art that LIBS uses a focused laser to vaporize and subsequently produce spectral line emissions from a sample material. Additionally, it should be noted that Grodzin discloses determining the composition of materials such as metal alloy, soil, or any matrix. It is generally understood that the materials could comprise elements such as magnesium, carbon or a material in a liquid or molten form.

Referring to claims 14-18,31-36,45-47,49-52. Grodzin discloses the invention as described above. Grodzin does not disclose determining that a threshold percentage of the collected optical emissions were emitted by one or more particular elements within the piece, the particular element being a low-Z element, aluminum, belonging to the same alloy group, or an aluminum alloy group. Graft discloses determining a threshold for the collected optical emissions being representative of the composition of the element in the subject deposit so that it is possible to differentiate between wanted and unwanted samples (See Col. 5 l. 25-27). Graft further discloses performing a screening, which is characteristic of the emission properties of the ion or elemental species contained in the sample to make a positive detection of a desired sample. It would have

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been obvious to a person of ordinary skill in the art to modify the method of Grodzin to include the teachings of Graft so that a threshold percentage of the collected optical emission were emitted by one or more particular elements so that it was possible to screen and classify low-Z elements, aluminum, alloys belonging to the same group, or alloys belonging to an aluminum alloy group. This would have been done so that it was easier to screen and classify particular elements or alloy groups from a mixed stream of elements. Additionally, it is understood that it would have been obvious to a person of ordinary skill in the art to analyze only the detected x-rays and to classify based on the detected optical emissions depending on the type of element you are sorting and classifying. It should be understood that Grodzin discloses radiation sources, sensors, and detecting devices for classifying based on the emitted radiation and characteristics (See at least Col. 4 l. 7 – Col. 5 l. 27). Additionally, it should be noted that Grodzin discloses determining the composition of materials such as metal alloy, soil, or any matrix. It is generally understood that the materials could comprise elements such as magnesium, carbon or a material in a liquid or molten form.

Referring to claims 20-25,37-39,41-44. Grodzin discloses the invention as described above in detail. Grodzin does not disclose creating one or more emissions spectra from the detected x-rays and detected optical emissions, estimating peak values for one or more regions of interest of the one or more spectra, or applying a shape fitting function to the data corresponding to the one or more regions. Graft discloses the invention as described above. Graft further discloses obtaining emissions spectra using different power levels and different excitation wavelengths (See Col. 5 l.

39-41). Additionally, Graft discloses estimating peak values for one or more regions of interest of the one or more spectra through means of a computer algorithm to calculate the subject fraction content of desired and undesired elements (See Col. 6 l. 7-16). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the apparatus of Grodzin to include the teachings of Graft so that you could screen more precisely for elements having certain characteristics. It should be noted that Grodzin discloses determining the composition of materials such as metal alloy, soil, or any matrix. It is generally understood that the materials could comprise elements such as magnesium, carbon or a material in a liquid or molten form.

Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grodzins (US-6801595) in view of Graft as applied to claims 1-3,70-9, 13-25,41-47, 49-52 as advanced above and in further view of Huang (US-6005211)

Referring to claims 4-6. Grodzins discloses the apparatus as discussed above in detail. Huang discloses a "Method and Apparatus For Sorting Articles Using Conveyor Cells". See Figs. 1-23 and respective portions of the specification. Huang further discloses a first conveyor (20) that conveys articles into an area and a second distinct conveyor (30-36) for conveying the articles out of the area. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the apparatus of Grodzins to include conveyors as taught by Huang so that the materials could be transported to be analyzed and classified in a timely, efficient and effective manner.

Claims 26-30,40,48,53-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grodzins (US-6801595) in view of Graft in view of Huang (US-6005211) and in further view of Kumar (US-6545240)

Referring to claims 26-30,48. Grodzins discloses the apparatus as described above in detail. Grodzins does not disclose a first conveyor conveying the piece of material into an area and a second distinct conveyor conveying the piece of material out of the area. Huang further discloses a first conveyor (20) that conveys articles into an area and a second distinct conveyor (30-36) for conveying the articles out of the area. Kumar discloses a "Metal Scrap Sorting System". See Figs. 1-10 and respective portions of the specification. Kumar further discloses a conveyor (12) for conveying particles, an image detector (14), position detector (18), laser system (20), target scanner assembly (22) light collectors (26), spectral analyzer unit (28), and a camera (36) for collecting and analyzing spectral data gathered from the particles (See at least col. 5 l. 45 – col. 7 l. 35). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the apparatus of Grodzins as taught by Huang and Kumar and have a conveyor system convey the articles between a first and second conveyor while they were being detected and analyzed, to speed up the process while making it more efficient and effective.

Referring to claim 40,53-61. Grodzin does not disclose wherein based on the classification, sorting the material by removing the material from the location associated with the classification or that the material is moving a rate of at least one foot per



second. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the apparatus of Grodzin to include the teachings of Huang and Kumar so that once materials were classified they were conveyed at a set rate to their respective location so that the materials could be detected and analyzed at a speed that made the process fast and efficient.

### ***Response to Arguments***

Applicant's arguments filed 3/13/2006 have been fully considered but they are not persuasive. In particular applicants focus on a optical emissions being emitted from a plasma resulting from a vaporization of a portion of the material is generally known in the field of the art for LIBS and is further taught by Grodzin, Graft, and Kumar. Applicants argument in regards to reducing classifications by one analyzing method and selecting the class based on the reduced number of classifications after the second method is taught by Grodzin in view of Graft (See claim rejections). Applicants arguments that the prior art of record does not teach estimating peak values for one or more regions of interest of the one or more spectra is unpersuasive as Graft clearly teaches estimating peak values (See Graft US-6753957 at least col. 5 l. 39 – col. 6 l. 16). Argument that prior art of record does not teach applying an electrical discharge to vaporize a portion of the material to produce a plasma is unpersuasive as Graft clearly teaches applying any suitable excitation source to vaporize a portion of the material (See at least Col. 4 l. 65 – Col. 5 l. 6). Furthermore, it is generally known in the field of

the art to vaporize plasma to detect optical emissions (See Kumar US-6545240 col. 1 l. 15-20). Consequently, as a review of the prior art undermines Applicant's arguments, the claims stand rejected.

Examiner has maintained the prior art rejections, statutory rejections and drawing objections as previously stated and as modified above. Applicants' amendment necessitated any new grounds of rejection present in this Office action

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Smith U.S. Patent No. 5628410 discloses a "Classifying or Sorting" method and apparatus that teaches irradiating items with X-rays or visible radiation in which the fluorescence or Raman emission of objects is detected to give a signal that can be used for selecting certain objects from a stream of mixed materials. Smith also teaches using two wavelengths to help sort and classify the objects.

Kelly U.S. Patent No. 4848590 discloses a "Apparatus for the multi-sorting of scrap metals by X-ray analysis" that teaches passing articles through x-ray analysis system including a high energy rays to induce x-ray fluorescence and a detector to detect the fluorescence in which the detector provides signals indicating the type of metal so that when pieces past by blast nozzles they are deflected on a specific classification path.

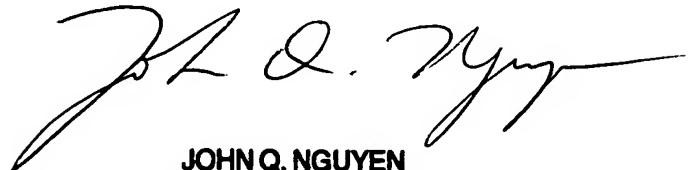
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Terrell H. Matthews whose telephone number is (571)272-5929. The examiner can normally be reached on M-F 8am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kathy Matecki can be reached on (571) 272-6951. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

THM



**JOHN Q. NGUYEN**  
**PRIMARY EXAMINER**